From sanghee Mon Jul 29 10:06:40 1996
Return-Path: <sanghee>
Received: by vishws.kaist.ac.kr (4.1/SMI-4.1)
id AA13728; Mon, 29 Jul 96 10:06:40 KDT
From: sanghee (USER)
Message-Id: <9607290006.AA13728@vishws.kaist.ac.kr>
Subject: CE T9/T10 from Hyundai/KAIST
To: coding_eff@facteur.std.com
Date: Mon, 29 Jul 1996 10:06:39 +0900 (KDT)
Cc: ap@dnrc.bell-labs.com, tktan@psl.com.sg, sanghee@vishws.kaist.ac.kr
X-Mailer: ELM [version 2.4 PL21-h3]
Content-Type: text
Content-Length: 4293
Status: RO

Dear CE T9/T10 colleagues,

In Tampere meeting, we(Hyundai/KAIST) proposed the DC prediction method
using median filtering and showed considerable improvements of bit savings
over VM.
Now, we propose another more efficient algorithm, which
can overcome performance degradations at the vertical(VM and Atul's)
and horizontal(Median) boundaries. Our preliminary results
prove advantages of our algorithm over others:

Bits for DC coding:

For QCIF,

Mother and daughter	New < Median < Atul's < VM
Akiyo	New < Median < Atul's < VM
Hall monitor	New < Median < Atul's < VM
Container ship	New < Atul's < Median = VM
Sean	New < Atul's < Median < VM
News	Median = New < Atul's < VM
Coastguard	New = Atul's < VM < Median

For CIF,

Mother and daughter	New < Median < Atul's < VM
Akiyo	New < Median < Atul's < VM
Hall monitor	New < Median < Atul's < VM
Container ship	New < Atul's < VM < Median
Sean	New < Median < Atul's < VM
News	New = Median < Atul's < VM
Coastguard	New = Atul's < VM < Median

'<' means 'less than', and
'=' means that bits difference is less than 50 bits for QCIF
and 100 bits for CIF.

We hope to discard our previously proposed median-based method and
participate in the CE T9/T10 with this algorithm.
Please let us know if there is any comments in this document
or any problem in joining T9/T10.
Looking forward to your comments.

Best regards,

Sang-hee Lee.

Title: New DC Prediction Method

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1. Functionality Addressed

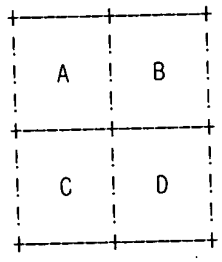
Improved coding efficiency

2. Framework

The goal of this experiment is to improve the performance of DC prediction coding in the current VM. NO syntax modifications are required.

3. Algorithm Description

In the figure shown below, D is the current block to be coded, and A, B and C represent the neighbor blocks already reconstructed.



D: current block to be coded

Let us denote the quantized DC coefficients of the block A, B, and C, as DC_A, DC_B, and DC_C, respectively.
Then, the DC predictor for the current block, DCp, is decided as follows:

If(abs(DC_A-DC_C) < abs(DC_A-DC_B)) DCp = DC_B
else DCp = DC_C,

where abs(.) represents an absolute value operator.

In the special cases such as at the borders of the VOP, following rules are applied:

- If there is neither of the block B nor C, DCp = 128
- If there is the block B, but not the block C, DCp = DC_B
- If there is the block C, but not the block B, DCp = DC_C

4. Test Conditions

- Test sequences: QCIF and CIF format class A and B
  Class A - Akiyo, Container ship, Hall monitor, Mother and daughter, Sean
  Class B - Coastguard, Foreman, News, Silent voice
- First frame only
- Quantization step size: 5 10 15 20 25

5. Evaluation Criteria

- Most important thing is how many bits for DC coding can be saved.
  So, coded bits for DC coefficients should be compared.
  As DC coefficient coding is lossless, its bit rate is not related with quantization step sizes. In other words, for a given image, its bit rate is fixed for all quantizations step sizes.

- And, the rate distortion curves are compared.

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